Claims

1. A valve (10) for closing a container (500) and for enabling the container (500) to be filled, said valve (10) comprising a housing (20) with an inlet port (30) and an outlet port (40) wherein said inlet port (30) is adapted for direct or indirect connection to a fluid source (700) and wherein said outlet port (40) is adapted for direct or indirect connection to said container (500);
a closing member (60; 260; 360; 460);
and at least one valve member (70; 270; 370; 470) which in a first position allows fluid communication between said inlet port (30) and said outlet port (40) and which, in a second position, prevents fluid communication from said inlet port (30) to said outlet port (40),
wherein said valve member (70; 270; 370; 470) is brought into and maintained in said first position only if a static pressure difference (ΔP3) across said valve member (70; 270; 370; 470) is below a pre-determinable first threshold.

2. A valve according to claim 1, wherein said valve member (70; 270; 370; 470) has force-generating means (80; 280; 380'', 80'; 480'', 80') adapted for providing a balancing force (Fx) to said valve member (70; 270; 370; 470) and for bringing said valve member (70; 270; 370; 470) into said first position when said filling condition is fulfilled.

3. A valve according to claim 2, wherein said force-generating means have a spring (280).

4. A valve according to one of the claims 1 to 2, wherein the valve member (370; 470) has an internal part (380'', 480'') comprised in said valve which can be operatively connected with an external part (80; 380'; 480') not comprised in said

valve (10) for bringing and maintaining said valve member (370; 470) into said first position.

5. A valve according to claim 4, wherein said internal part (380''; 480'') has a first magnet (381) or a magnetisable element (481) providing a balancing force (Fx) for bringing said valve member (370; 470) into said first position when said valve is brought into proximity with an external part (380'; 480') having a second magnet (382; 482).

6. A valve according to one of the claims 1 to 5, wherein said closing member (60; 260; 360; 460) is formed as a check valve.

7. A valve according to claim 6, wherein said check valve (260) and said valve member (270) are formed on a body (260) movable in a chamber (50) of said housing (20) between said inlet port (30) and said outlet port (40).

8. A valve according to one of the claims 6 or 7, wherein said check valve (260) comprises a pin (290) attached to an end of said check valve (260) directed towards said inlet port (30).

9. A valve according to one of the claims 7 to 8, wherein said housing has a chamber divided in to an upstream chamber (251) and a downstream chamber (352) in communication with one another, wherein said upstream chamber (351) is adapted for reciprocatingly accommodating said closing member (60) wherein said downstream chamber (352) is adapted for reciprocatingly accommodating said valve member (370) at least between said first and second position.

10. A valve according to one of the claims 5 and 9, wherein said downstream chamber (352) is adapted for aligning movement of said valve member (370) in the direction of magnetic attraction or repulsion between an internal part (380''; 480'') and an external part (380'; 480').

11. A system for filling a container (500) with a fluid exclusively from an authorised fluid source (700), comprising a pressure regulating means (720) in fluid communication to said fluid source (700) and adapted for connection with a valve (10) on said container (500) according to one of the claims 2 to 12, wherein said pressure regulating means (720) is designed to maintain the pressure of the fluid supplied to said container (500) below a pre-determined or pre-determinable first threshold selected in such a way that said valve member (70; 270; 370; 470) of said valve (10) is brought into and maintained in said first position.

12. A system according to claim 11, wherein said system has fluid flow rate sensing means (730) for measuring the flow of liquid into said container (500), said system further comprising control means (710) operatively connected to said pressure regulating means (720) and said fluid flow rate sensor means (730).

13. A system according to claim 11 or 12, wherein said pressure regulating means (720) is adapted for providing a delivery pressure of a pre-determined minimum magnitude and for increasing the delivery pressure in a manner controllable via said control means (710).

14. A system according to one of the claims 11 to 13, wherein during operation of the system relating to the filling of a container (500) from a fluid source (699) connected to that

system, said control means initially commands the pressure regulation means to provide a delivery pressure of a magnitude below a first predetermined threshold value and then to increase the delivery pressure, maintaining the fluid flow rate within a pre-determined range.

15. A system according to one of the claims 11 to 14, wherein the system further comprises an external part (380'; 480') of said force-generating means which can be brought in operative connection with an internal part (380''; 480'') of a force-generating means in a valve according to one of the claims 4 to 10.

16. A system according to one of the claims 11 to 15, wherein the system comprises means for weighing (770) said container (500) coupled to said control means (710).

17. A container for storing fluids, wherein said container is provided with a valve according to one of the claims 1 to 10.

18. A container according to claim 17, wherein the valve is permanently connected to an opening of said container (500).

19. A method for filling a container (500) having a valve (10) according to one of the claims 1 to 10 with a fluid from a fluid source (600), comprising the steps
    a) connecting the valve (10) to said fluid source (600)
    b) controlling the delivery pressure (P1) of said fluid at an inlet port (30) of said valve (10) such as to maintain the static pressure difference ($\Delta P3$) across a valve member (70; 270; 370; 470) of said valve below a predetermined or predeterminable first threshold.

20. A method according to claim 19, wherein step b) comprises the sub-steps of

b1) initially providing a static delivery pressure to said inlet port (30) of said valve (10) that is less than a predetermined second threshold during a predetermined or predeterminable period of time

b2) after step b1, increasing said delivery pressure continuously or in a plurality of steps.

21. A method according to one of the claims 19 or 20, wherein step b comprises the sub-steps of

b3) initially providing a delivery static pressure to said inlet port which is less than a second threshold value

b4) measuring the fluid flow rate of fluid flowing into said valve (10)

b5) if said fluid flow rate is decreasing, then increasing the magnitude of said delivery static pressure (P1) in a predetermined or predeterminable manner

b6) continuing steps b4 and b5 until the measured fluid rate is zero.

22. A method according to one of the claims 19 to 21, wherein step b) comprises the further sub steps of

b7) measuring the static pressure at said inlet port (30)

b8) if said static pressure in said step is within a predetermined third threshold value of the magnitude of the pressure of the container when full, discontinuing filling of container and disconnecting the valve from said fluid source

b9) if said static pressure in step b7 is less than a pre-determined third threshold value of the magnitude of the pressure of the container when full, discontinuing filling of container, releasing pressure in

the valve upstream of the outlet port (40), resuming filling of container and continuing with steps b7) to b8).

23. A method according to one of the claims 19 to 22, wherein before and/or during the filling procedure, the weight of the container (500) is continuously measured.